

CLAIMS

What is claimed:

1. A moisture-activated adhesive composition comprising the reaction product of: (i) the reaction product of a hydroxyl terminated alkoxylated tertiary amine and at least one monofunctional organic blocking agent, wherein free hydroxyl groups initially present in the hydroxyl terminated alkoxylated tertiary amine are at least partially blocked, and (ii) a polyisocyanate.
2. The moisture-activated adhesive composition of claim 1, wherein the hydroxyl terminated alkoxylated tertiary amine comprises an ethoxylated and propoxylated derivative of ammonia or an aliphatic amine bearing active hydrogen groups.
3. The moisture-activated adhesive composition of claim 1, wherein the hydroxyl terminated alkoxylated tertiary amine has a number averaged molecular weight of at least 500.
4. The moisture-activated adhesive composition of claim 1, wherein the hydroxyl terminated alkoxylated tertiary amine comprises between one to ten aliphatic tertiary amine groups per molecule, on a number averaged basis.
5. The moisture-activated adhesive composition of claim 1, wherein the hydroxyl terminated alkoxylated tertiary amine comprises the reaction product of ethylene diamine with ethylene oxide and propylene oxide, wherein all amine groups in the ethylene diamine have been converted into tertiary amines in the reaction product.
6. The moisture-activated adhesive composition of claim 1, wherein the hydroxyl terminated alkoxylated tertiary amine comprises from 2 to 60% by weight of oxyethylene units, relative to the weight of the hydroxyl terminated alkoxylated tertiary amine.

7. The moisture-activated adhesive composition of claim 1, wherein at least 30 mole percent of the free hydroxyl groups initially present in the hydroxyl terminated alkoxylated tertiary amine have been converted into urethane groups.
8. The moisture-activated adhesive composition of claim 1 comprising about 70% to about 90% by weight of the polyisocyanate.
9. The moisture-activated adhesive composition of claim 1 comprising at least 10% by weight of the reaction product of the hydroxyl terminated alkoxylated tertiary amine and the at least one monofunctional organic blocking agent.
10. The moisture-activated adhesive composition of claim 1, wherein the monofunctional organic blocking agent comprises phenyl isocyanate.
11. A moisture-activated adhesive composition comprising the reaction product of: (i) the reaction product of a hydroxyl terminated alkoxylated tertiary amine and a blocking agent comprising phenyl isocyanate, wherein at least 25 mole percent of free hydroxyl groups initially present in the hydroxyl terminated alkoxylated tertiary amine are blocked, and (ii) a polyisocyanate.
12. The moisture-activated adhesive composition of claim 11 comprising about 70% to about 90% by weight of the polyisocyanate.
13. The moisture-activated adhesive composition of claim 12 comprising at least 10% by weight of the reaction product of the hydroxyl terminated alkoxylated tertiary amine and the blocking agent.
14. A process for bonding multiple lignocellulosic or cellulosic substrates comprising the steps of:
 - a. applying to a surface of a first substrate the moisture-activated adhesive composition of claim 1;

- b. contacting the surface of the first substrate with a surface of a second substrate at a temperature in the range of from 10°C to 30°C; and
- c. applying pressure to the contacted surfaces for a length of time sufficient to achieve an adhesive bond between the contacted surfaces.

15. A process for bonding multiple lignocellulosic or cellulosic substrates comprising the steps of:

- a. applying to a surface of a first substrate the moisture-activated adhesive composition of claim 11;
- b. contacting the surface of the first substrate with a surface of a second substrate at a temperature in the range of from 10°C to 30°C; and
- c. applying pressure to the contacted surfaces for a length of time sufficient to achieve an adhesive bond between the contacted surfaces.

16. A composite article comprising a first substrate and a second substrate bonded with the moisture-activated adhesive composition of claim 1.

17. A composite article comprising a first substrate and a second substrate bonded with the moisture-activated adhesive composition of claim 11.

18. The composite article of claim 16 comprising a total delamination value of less than 2% as measured according to the cyclic delamination test procedure of ASTM D-2559-00 Section 15.4.1.

19. The composite article of claim 17 comprising a total delamination value of less than 2% as measured according to the cyclic delamination test procedure of ASTM D-2559-00 Section 15.4.1.

20. A catalyst for use in polyisocyanate-based adhesives comprising the reaction product of a hydroxyl terminated alkoxylated tertiary amine and at least one monofunctional organic

blocking agent, wherein free hydroxyl groups initially present in the hydroxyl terminated alkoxyLATED tertiary amine are at least partially blocked.

21. The catalyst of claim 20, wherein all of the free hydroxyl groups initially present in the hydroxyl terminated alkoxyLATED tertiary amine are blocked.
22. The catalyst according to claim 20, wherein the monofunctional organic blocking agent comprises phenyl isocyanate.
23. The catalyst according to claim 20, wherein at least 30 mole percent of the free hydroxyl groups initially present in the hydroxyl terminated alkoxyLATED amine are blocked.
24. The catalyst according to claim 20, wherein the hydroxyl terminated alkoxyLATED tertiary amine has a number averaged molecular weight of at least 500.
25. The catalyst according to claim 20, wherein the hydroxyl terminated alkoxyLATED tertiary amine comprises between one to ten aliphatic tertiary amine groups per molecule, on a number averaged basis.
26. The catalyst according to claim 20, wherein the hydroxyl terminated alkoxyLATED tertiary amine comprises the reaction product of ethylene diamine with ethylene oxide and propylene oxide, wherein all amine groups in the ethylene diamine have been converted into tertiary amines in the reaction product.
27. The catalyst of claim 20, wherein the hydroxyl terminated alkoxyLATED tertiary amine comprises from 2 to 60% by weight of oxyethylene units, relative to the weight of the hydroxyl terminated alkoxyLATED tertiary amine.